An international analysis of the economic cost for countries located in crisis zones

Diana Abu-Ghunmi

School of Business, The University of Jordan, Amman 11942, Jordan

Shaen Corbet

DCU Business School, Dublin City University, Dublin 9, Ireland

Charles Larkin

Trinity Business School, Trinity College Dublin, Dublin 2, Ireland

Abstract

We study the impact on a country's economy of sharing a direct land border with a country experiencing conflict. Through analysing sixty-three major episodes of regional instability during the period between 1990 and 2016 by using panel data methods applied to unrestricted error correction model, the opportunity cost of such regional conflict is examined. The resulting estimates of GDP loss are most profound for countries in Africa, Asia and the Middle East. Regional turmoil resulting from conflict has been found to have significantly reduced GDP growth in Angola, China, Kuwait, Mauritania, Saudi Arabia, Sudan and Tanzania, with estimates ranging from over 3% to 7% average reductions in GDP growth rate using both pooled OLS and fixed effects estimations (with an international average of 0.95% and 1.18% respectively). This considerable opportunity costs of military expenditure raise an important and challenging question to the concerned governments about the economic and social rightfulness of this expenditure and whether their people ultimately pay the price for the government decisions of increasing military spending.

Keywords: Opportunity Cost; GDP; FDI; Regional Instability.

Email addresses: d.abughunmi@ju.edu.jo (Diana Abu-Ghunmi), shaen.corbet@dcu.ie (Shaen Corbet), larkincj@tcd.ie (Charles Larkin)

1. Introduction

Nowadays, it is clear that regional instability is not confined to a particular region or part of the world with evidence presented by the ongoing conflict in Syrial, Iraq, and Yemen, the tensions on the Korean Peninsula due to threatening behaviour related to the North Korean ballistic missile programme, and with tensions rising between Russia and Europe. Disturbingly regional conflicts seem to have a spillover effect, Corbet et al. [2017] found that stock market volatility in France, Germany, Greece, Italy and the UK were directly affected by the growing terror activities that have been inspired by ISIL since 2011. In this connected world, new events instantaneously appear in the news and financial markets across the globe rapidly reflect these news on the valuations of securities to partially reflect risks including geopolitical risks as well as investor sentiment. It seems sensible to hypothesise that incidents of conflict, especially those of large-scale, should have an immediate material consequences to financial markets with respect to both valuations and volatility.

Insert Table 1 about here

Abu-Ghunmi and Larkin [2016] examined the effect of regional instability on a number of measures of economic activity using Jordan as the key country of interest. Their analysis serves as a focal point for the development of the international comparison contained within our selected methodology. Jordan was found to be an example of a country possessing military spending and FDI inflows that were highly sensitive to broad regional conflict in the Middle East. This unfortunate side-effect of necessitating a high level of militarisation has resulted in foregone public investment of between US$12.6 billion and US$22.7 billion, which is equivalent to between 40% and 72% of its 2012 level of GDP and approximately 2.5 times that of its 2005 level of GDP. This could be thought of as a representation of the 'neighbour's curse' term of Ades and Chua [1997] which describes the country's unfortunate location of being beside a country that suffers turmoil and chaos generated by conflict. In fact, Ades and Chua [1997] studied a large set of countries and found the political turmoil in neighbouring countries negatively affected the economic growth in a country, as it resulted in increasing the country's military spending in addition to disrupting its international trade. In this paper we build upon the work in Abu-Ghunmi and Larkin [2016]. We examine the impact that regional political instability across the international community have on the concerned countries' economies based on the largest international conflicts that have occurred between 1990 and 2016. To this effect, we have incorporated sixty-three major conflicts as described in Table 1. The economic growth rates and the GDP values that are lost to increased military expenditure as a response to regional conflicts are estimated. The results of such analysis are most relevant to government institutions, economists and humanitarian aid provision centres within such denoted conflict regions to name a few.

The remainder of this paper is organised as follows: Section 2 discusses the relevant literature, Section 3 presents the data and illustrates the methodology, Section 4 presents the findings and discusses the results , and Section 5 concludes the paper.

2. Literature Review

Literature on how countries' economic conditions are affected by the presence of conflict and terrorist activity is rather extensive. Wisniewski [2016] has produced a literature survey of how stock returns and politics are connected, even though causality is difficult to discern in many cases. Institutional stability and quality also matters for investment, with Buchanan et al. [2012] finding that improving institutional quality by 1 standard deviation boosts FDI by 1.69. When looking directly at war itself, few financial market event studies have been conducted but work by Hudson and Urquhart [2015] illustrates the importance of military events and their outcomes on a country's stock markets and the relative efficiency between jurisdictions. Efobi and Asongu [2016] find evidence, using a Generalised Method of Moments (GMM) technique based on forward orthogonal deviations as well as a quantile regressions (QR) estimation technique, that conflict in Africa, particularly terrorism, induces capital flight from African economies.

Conflict situations and economic conditions are also reflexive. Martin et al. [2008] find that while the simple correlation illustrates that the more open the economy the less likely international conflict is to take place, that is not the case when controlled for the effects of globalisation. Martin et al. [2008]'s results find the opposite result to what would be expected, with countries in close proximity having a 21% in conflict probability due to globalisation effects. "...even in a model where trade increases welfare and war is Pareto dominated by peace, higher trade flows may not lead to more peaceful relations. Indeed, what matters ultimately is the geographical structure of trade and its balance between bilateral and multilateral openness. Bilateral trade, because it increases the opportunity cost of bilateral war, deters bilateral war. Multilateral trade openness, because it reduces this opportunity cost with any given country, weakens the incentive to make concessions during negotiations to avert escalation and therefore increases the probability of war between any given pair of country. From this point of view, an increase in trade between two countries pacifies relations between those but increases the probability of conflict with third countries." [Martin et al., 2008, p894]. The counterpoint to this result is the importance of bilateral trade flows in preventing conflicts, placing more importance on regional trade agreements over multilateral global trade as a source of geopolitical stability.

The standard understanding of global investment patterns is that capital seeks the highest yield given there are no capital constraints. The work by Younas [2015] shows that the Feldstein and Horioka [1980] paradox holds. Their analysis finds that terrorist events drive savings out from the developing economies to the developed and also concludes that investment in developing countries are damaged by terrorist events . In a further study of 102 countries by [Procasky and Ujah, 2016] looks at how price of sovereign debt is changed by terrorism events. The authors find that a 20% increase in the scale of terrorist events

results in a negative change in outlook on sovereign bonds and the resulting downgrade of the credit rating of sovereign debt is higher in developing countries compared to developed countries . It is clear from earlier work by Abu-Ghunmi and Larkin [2016] and others that investment is negatively impacted upon by conflict. But what about the potential for military and security expenditure having a positive impact on the economy through domestic stimulus, an idea dating back to Kalecki [1943]?. Even though, Dakurah et al. [2001] found military expenditure did not seem to have an effect on economic growth. Deger and Smith [1983] pointed out that reduction in savings induces opportunity cost due to that forgone investment and this explains the theoretical adverse impact of military expenditure on economic growth. The authors also reported that the negative impact on economic growth materializes when military spending impact on savings prevails its good impact of modernization. On another theoretical ground, Aizenman and Glick [2006] found economic growth has shown a non-linear relationship with military expenditure. On the one hand they found direct evidence that economic growth in countries located in the Middle East is negatively affected by military spending. On the other hand they found there is a threshold level to external threat that affects the relationship, above this level the impact of military expenditure on economic growth is positive, while below this level the impact is negative. The authors also documented a role for corruption concerning how military expenditure affects economic growth; when corruption is high the impact is negative while in low corruption environment the impact is positive. Further evidence was reported by Abu-Bader and Abu-Qarn [2003] who found that threats, whether domestic or regional, have driven military expenditure which in turn resulted in a negative impact on economic growth in a number of countries in the Middle East. Chen et al. [2014] presented evidence that private investment, in low and middle income countries, is crowded out by military expenditures with the consequences of reducing economic growth, while in high income countries the Keynesian effect prevails with military expenditure enhancing economic growth. Furthermore, Bove and Nisticò [2014] examined, using panel data techniques, whether military intervention in politics has an impact on defence spending. The authors found the greater the involvement of military in policy-making , the greater the possibility of military spending as a percentage of GDP.

Chang et al. [2011] carried out Arellano and Bond [1991] dynamic panel data estimation technique on 90 countries during the period from 1992 to 2006 and found that in low-income countries as well as in three of the four investigated regions; Europe, Middle East, in addition to South Asia, economic growth is negatively driven by military expenditure, however, the relationship is more significant for the regions than for the low-income countries. Also using dynamic panel data analysis on a number of countries that exceeded 130 countries and over a period of time extended from 1963 to 2000 Töngür et al. [2015] reported military expenditures is negatively related to economic growth. They highlighted two important issues within their findings related to political regimes and income inequality. The authors emphasized the importance of political regimes in the amount of military spending and confirmed that the level of democracy negatively relates to military spending. In addition, they reported a positive association between income inequality and military expenditure.

Alptekin and Levine [2012] found military spending is positively related to economic growth in developed countries. In addition, they reported a non-linear relationship which they explained to indicate that military expenditure positively relates to economic growth, however after certain point the increasing military expenditure results in a higher opportunity cost that causes the relationship to change into negative. Interestingly, Gupta et al. [2014] emphasized the importance of investment quality in determining the impact of public capital on economic growth. Khalifa et al. [2017] studied what effect, global financial crises along with geopolitical instability, have on oil-rich countries, using a spillover Asymmetric Multiplicative Error Model. They found that oil prices, natural gas prices and petroleum-based stock markets are significantly affected by these event. In the aftermath of the same crisis, Batuo et al. [2018] examined the impact that the financial liberalisation and financial development have on economic growth and financial stability and found that financial instability is reduced by economic growth. Further, when considering the assets that are traditionally used during periods of crises, Zhu et al. [2018] showed that during the global financial crisis of 2008-2009, gold acted as a hedge in the UK stock market. Further, when considering agricultural commodity markets, Fernandez-Diaz and Morley [2019] found structural changes in the correlations between the returns of crude oil prices and the GSCI index and all the studied macroeconomic variables and the structural changes accompanied the 2008 financial crisis. Their results showed that there is volatility spillover between maize and crude oil, which could be due to an increasing interdependence between the two markets that resulted from introducing biofuel policies. In addition, Ben Salah Mahdi and Boujelbene Abbes [2018] found that capital and risk are positively related in Islamic banks with a bidirectional relationship, while Ben Rejeb [2017] suggested that Islamic finance seems not able to protect from financial and economic shocks that impact conventional markets. Arnold and Soederhuizen [2018] found that liquidity uptake and bank instability are positively related when they studied the relationship between the European banking industry's stability and ECB refinancing operations during the financial crisis.

Using firm-level data, Chen [2017] and Oh and Oetzel [2017] found that conflicts not necessarily affect economy negatively. They showed that experience in conflict zone and national resources are important factors. They reported an improvement in FDI performance as the experience of companies to operate in conflicts zones gets better. In fact these authors provide support to the theory that conflict not always have negative impact on the economy, rather the conflict itself through a number of idiosyncratic factors play a role in determining the impact on the economy. The findings are in agreement with the researchers of armed conflict argument that not all armed conflicts negatively affect the economy and the state and that a country's involvement in an armed conflict could be taken as a positive indicator of a country's available resources or its capacity (Oh and Oetzel [2017]). Caution should be taken here as this study focused on firms with headquarters in the UK and on extraterritorial conflicts.

There is also evidence of direct effects at both the country-specific and regional levels. Manamperi [2016] used a modified Barro model to examine how economic growth in two of NATO countries; Turkey and Greece that are characterised by higher spending on military; is affected by such military expenditure. The authors reported that while Greece economic

growth is not affected by military spending, military spending has an adverse impact on Turkey's economic growth. However, Sulvanathan and Sulvanathan [2014] found economic growth in Sri Lanka is driven by defence expenditure and the relationship is unidirectional. They argued that considering that Sri Lanka has suffered from civil war for 30 years, such finding is unique. Looking to the impact of war on economy using different dimensions, Serneels and Verpoorten [2013] found that in Rwanda, the more intense the conflict the worse the impact on households consumption which was in comparison found to lag years behind. They also reported that return to two factors; labour and land are affected by conflict intensity. In the Republic of Korea, Yang et al. [2015] examined the effect an increase in military expenditure would have on the economy and found that to have better effect on GDP then indirect tax rate should be raised while for gross output, the solution is increasing corporate income tax. Wang et al. [2012] examined the effect of military spending on the members of the Economic Co-operation and Development organization using the Malmquist productivity index. The authors documented a higher economic productivity is associated with defence expenditure.

3. Data and Methodology

3.1. Data

Annual observations for the period 1990-2016 were obtained for the following variables[1]. General government total expenditure in each national currency was obtained from World Economic Outlook (WEO) Subject Code in April 2017 taken directly from the WEO database[2]; General government final consumption expenditure (current LCU)- the difference between these two variables is taken to be the government capital expenditure ; Military expenditure (current LCU); Military expenditure (as a percentage of GDP); GDP (current US$); GDP (curreny LCU); Foreign direct investment, net inflows (BoP, current US$); FDI net inflows as a percentage of GDP and Household consumption expenditure per capital (constant 2010 US$) obtained from the world development indicators[3].

Our sample then utilises a broad number of sixty-three international periods of crises in regions located within the confines of active armed conflict. These conflicts are listed in Table 1. The identification of these crisis periods enables two specific avenues of research: 1) we can investigate the direct consequences of armed conflict in terms of the opportunity cost to the country in which the conflict occurred; and 2) we can investigate the direct consequences of armed conflict upon countries who share a border with a country in the midst of armed-conflict.

[1] Data for a few of the variables began in the years shortly after 1990 and possess start years based on availability

[2] Available at https://www.imf.org/external/pubs/ft/weo/2017/02/weodata/download.aspx

[3] https://datacatalog.worldbank.org/dataset/world-development-indicators

3.2. Methodology

3.2.1. Interrupted time series model

In principle this paper follows Anderton and Carter [2001], and uses the multiple interrupted time series analysis of Lewis-Beck and Alford [1980] to study the impact of armed conflicts or wars on the economies of countries whose neighbours are experiencing such conflicts, as follows:

$$\begin{aligned} \ln(\mathrm{EconomicActivity}_{it}) = {} & \beta_0 + \beta_1 * \mathrm{Tr}_i + \beta_2 * \mathrm{WL}_{it} + \beta_3 * \mathrm{WT}_{it} \\ & + \beta_4 * \mathrm{PL}_{it} + \beta_5 * \mathrm{PT}_{it} + {}_{it} \end{aligned} \tag{1}$$

i is ith country and ranges from 1 to N and t is time measured in years that ranges from 1 to T; For each country i; the following variables are defined ln(EconomicActivity) is the natural logarithm of an economic activity measure; Tr : is a trend takes number 1 for the first year in the series and continues as 2, 3, etc. until the end of the time series; WL_t : war level is a dummy variable that takes the value of 0 for each year before the start of the armed conflict or war in a neighbouring country and 1 for each year during war and for each year afterwards; WT_t : war trend takes the value of 0 for each year before the start of war in a neighbouring country and then 1,2,3, etc. for the years during and after the war up to the end of the time series; PL_t: peace level is a dummy variable that takes the value of 0 for each year during and before the start of war in a neighbouring country and 1 for each year after the end of the war; PT_t: peace trend takes the value of 0 for each year before and during war and then 1,2,3, etc. for the years after the end of the war. For wars the start and end in the same calendar year; WT_t: war trend and PL_t: peace level are dropped out of equation (1) and PT_t: peace trend is re-defined to take the value of 0 for each year before the start of war in a neighbouring country and then 1,2,3 etc. for the years during and after the end of the war (according to Anderton and Carter [2001], the last modification results in a model similar to the model used by Barbieri and Levy [1999] for short wars). β_0 is the intercept coefficient that represents the level of the economic activity before war; β_1 is the trend coefficient that captures the rate of growth of the economic activity before the war; β_2 is war level coefficient which captures the impact of war on the level of the economic activity and β_3 is war trend coefficient which measures the effect of war on the rate of growth of the economic activity; β_4 is peace level coefficient which captures the effect of war end on the level of the economic activity; β_5 is the peace trend coefficient which measures the impact of war end on the rate of growth of the economic activity.

Anderton and Carter [2001] used ordinary least square method and maximum likelihood, however, as this study uses panel data, equation (1) is estimated as a fixed effect model to account for unobserved individual differences between countries which are assumed to be time-constant following (Allison. 1994, (p.183)). Data dictates that some countries have experienced separate periods of conflicts in neighbouring countries. (Allison. 1994, (p.183)) point out that when repeated events have immediate and persistent effects however the effects are not uniform then separate dummies are constructed for each of the events. Therefore, as the data dictates that many countries have experienced conflicts in neighbouring countries in separate periods of time, countries are grouped based on the number of war and peace variables that were constructed for each country. War and peace variables range from covering a short war that ended in one year to three separate war periods. Furthermore, some war periods last until the end of the time series leaving no room for peace variables.

Insert Tables 2 through 7 about here

Tables 2 through 7 report the results of the multiple interrupted time series models that have been selected to add robustness to our reported results. The selected methodologies specifically investigate: i) foreign direct investment as a % of GDP; ii) GDP in US$; iii) government capital expenditure as a % of GDP; iv) household consumption per capital; and v) military expenditure as a % of GDP; all economic activity measures are in natural logarithm. As in Anderton and Carter [2001] and Abu-Ghunmi and Larkin [2016], the coefficient of interest is that related to the variable representing War Level.

3.2.2. Unrestricted error correction modelling

This paper follows Arunatilake et al. [2001] who used the unrestricted error correction model to estimate the impact of military expenditure on government capital expenditure, we use the approach however, we apply the panel error correction model (Sjölander et al. [2017]) as this study uses panel data. Similarly, unit root tests are applied in the panel data context to test for the stationarity of the time series[4]:

$$\begin{aligned} DGovCapGDP_{it} = {} & \alpha_0 + \alpha_1 MiExpGDP_{(it-1)} + \alpha_2 DMilExpGDP_{(it)} + \alpha_3 FDIGDP_{(it-1)} \\ & + \alpha_4 DFDIGDP_{(it)} + \alpha_5 GovCapGDP_{(it-1)} + \alpha_6 MergedBorDum_{it} \end{aligned} \tag{2}$$

i is ith country that ranges from 1 to N and t is time measured in years that ranges from 1 to T; For each country i ; the following variables are defined, $DGovCapGDP_t$ and $GovCapGDP_{(t-1)}$ represent the difference in government capital expenditure as a percentage of GDP at time t and government capital expenditure as a percentage of GDP at time t-1, respectively. $MiExpGDP_{(t-1)}$ and $DMilExpGDP_{(t)}$ represent military expenditure as a percentage of GDP at time t-1 and the difference in military expenditure as a percentage of GDP at time t, respectively. $FDIGDP_{(t-1)}$ and $DFDIGDP_{(t)}$ represent foreign direct investment as a percentage of GDP at time t-1 and difference in foreign direct investment as a percentage of GDP at time t, respectively. $MergedBorDum_t$ is a dummy variable that takes the value of one for each year that experienced war in a neighbouring country and zero otherwise.

Equation (2) is estimated using pooled OLS with Arellano and Bond [1991] panel cluster standard errors which are robust to heteroscedasticity and serial correlation (Vogelsang [2012]) and then estimated as fixed effect model to account for the endogeneity problem that results from the potential correlation between the unobserved effects and the explanatory variables (Wooldridge [2002]; Semykina and Wooldridge [2010]).

Insert Table 8 about here

[4] Unit root test showed that all variables; government capital expenditure as percentage of GDP, military expenditure as percentage of GDP and foreign direct investment as percentage of GDP, have integration order of 1

Table 8 reports the results for the described unrestricted error correction model for the entire sample of countries using both a pooled OLS and fixed effect one way estimates. Arunatilake et al. [2001] and Abu-Ghunmi and Larkin [2016], who followed them, pointed out when the studied variables are found to be non-stationary using augmented Dickey-Fuller (ADF) test, there is a risk of obtaining spurious relationships and hence to avoid such risk unrestricted error correction modelling can be used. Therefore, following these recommendations, the ADF test is used to examine the stationarity of the variables and the unrestricted error correction model is used to estimate Equation (2).

3.2.3. Measuring the indirect cost to the economy: i.e. opportunity costs

To calculate the effect of military expenditure on economic growth; i.e. the output lost due to increasing military spending, the paper follows the approach previously used by Arunatilake et al. [2001] and Abu-Ghunmi and Larkin [2016] as follows:

1. Equation (2) is used to estimate the impact on government investment of increasing military spending.
2. The incremental capital output ratio (ICOR) is calculated for each country and for each year. The ICOR approach is in fact the Comparative Static Harrod-Domar model of Grobar and Gnanaselvam [1993] as indicated by Arunatilake et al. [2001] and is calculated by dividing the investment as a percentage of GDP by the GDP growth rate.
3. Then the ICOR is used to estimate the drop in GDP growth due to military spending and the lost GDP for each country for each year.
4. A 2% rate of return, which is similar to the rate of return on FDI inflows as reported by OECD [2013] and used by Abu-Ghunmi and Larkin [2016], is also used in this paper to calculate the future value of the lost GDP as of 2016.

4. Discussion of results

4.1. The Crisis Zone Impact on Economic activities

Table 7 reports the results of estimating multiple interrupted time series models for each of a number of economic activity measures[5]. The estimated coefficients in each model represent the following; the intercept measures the economic activity level before the crisis, that has been caused by the selected conflicts, begins; the Trend variable coefficient shows the economic activity growth rate before the crisis begins.; the coefficients on war level and peace level measure the impact of war and war end, respectively, on the economic activity level; the coefficients on war trend and peace trend measure the impact of war and war end, respectively , on economic activity growth rate (Anderton and Carter [2001]).

With regards to GDP, the results show that level of GDP as well as its growth rate fell in the period after the crisis, in the studied countries, had begun. However, after the conclusion of war, GDP shows reversion to its pre-conflict levels . Interestingly,

[5] Each individual measure is presented in Table 2 through 6

military expenditure measured as a percentage of GDP is found to increase during the period of crisis in the analysed countries. Of interest however, is the observation that this military spending shows no reversion in trend in the period thereafter. Government capital expenditure measured as a percentage of GDP has declined during episodes of conflict, but is found once the war period concluded there is evidence of some restoration in government capital spending. Finally, the growth rate of foreign direct investment as a percentage of GDP is found to be negative indicating fall in this economic activity during the studied crises periods. Nevertheless, there is evidence of an increase in the level of foreign direct investment after the conflict has been resolved.

Table 8 shows strong evidence that government capital investments is negatively affected by government's military expenditure, which is consistent with the findings of Arunatilake et al. [2001] and Abu-Ghunmi and Larkin [2016] who found that government capital investment can be crowded out by military spending. Using both pooled OLS and fixed one way estimates, we can identify strong negative relationships for the measures of military expenditure as a percentage of GDP[6].

4.2. The Indirect Cost of Crisis Zone to Economy: Opportunity Costs

We now turn the discussion to the indirect costs borne by a country as a result of its position within a conflict zone. Abu-Ghunmi and Larkin [2016] showed that a country's location indeed matters. In order to measure such economic opportunity costs that result from investment lost to increasing military spending by the government, both pooled and fixed effect estimates were utilized with outliers excluded and value measured as of 2016, US$). Tables 9 and 10 present the results of these estimates.

Insert Tables 9 and 10 about here

Tables 9 and 10 report the estimates of the country's average ICOR, the average drop in government capital expenditure as a percentage of GDP as a result of increasing military spending and the average drop in GDP growth rate in the same period. In addition to the country's average estimated loss of GDP during the sample period and the sum of the future values of yearly lost GDP measured as of 2016 . Using the pooled OLS methodology, it is found that government capital expenditure as a proportion of GDP falls by an average of 1.16% in countries that are located in a crisis zone . Similarly, GDP growth rate is found to fall by 0.95%. The fixed effects estimations provide similar estimates of 1.37% and 1.18% decreases in the same measures respectively. Including all countries within the investigated sample, the pooled OLS methodology estimates that $135 billion of average GDP was lost while the sum of lost GDP due to crises generated by conflict, taking time value of money

[6] Abu-Ghunmi and Larkin [2016] carried out a robustness check of this possible negative impact on capital formation using five countries of the world top ten peaceful countries according to the 2014 world survey of the Institute for Economics and Peace. They show that this result is not broadly found. the five peaceful countries; Canada, Denmark, Finland, New Zealand and Switzerland

into account at only 2 % rate of return , accounted for $247.470 trillion. The fixed effect estimations presented results of $162 billion and $298.127 trillion respectively.

Table 9 shows countries with significant deteriorations of the level of government capital to GDP ratios include Angola (-2.27%), Djibouti (-2.26%), Israel (-3.27%), Jordan (-2.32%), Kuwait (-4.97%), Oman (-5.01%), Saudi Arabia (-3.95%) and the Republic of Yemen (-2.24%). While the pooled OLS results are presented, similar results are portrayed using the fixed effects estimation methodology. The largest average decreases in GDP growth occurred in Angola (2.43%), Burkina Faso (2.55%), China (4.00%), Georgia (2.22%), Kuwait (3.17%). Mauritania (2.93%), Oman (2.17%), Saudi Arabia (5.83%), Sudan (3.66%) and Tanzania (6.23%). While considering both average estimated loss of GDP and the sum of GDP losses as its value in 2016 measured using 2 % rate on return. China presents itself as the most significantly economically exposed nation due to military expenditure in both categories with $6.000 trillion yearly average GDP loss which amounts to a total loss, as of 2016, of $134.019 trillion. China is followed by Saudi Arabia ($1.028 trillion average GDP loss and $37.444 trillion total GDP loss), India ($494 billion average GDP loss and $14.472 trillion GDP loss), Russia ($404 billion average GDP loss and $10.404 trillion total GDP loss) and the United Arab Emirates ($265 billion average GDP loss and $5.395 total GDP loss) respectively. Batuo et al. (2018) found that financial instability is reduced by economic growth, if this effect is considered here then it could be argued that the lost economic growth in countries located in crisis zone due to military spending might have also impacted negatively financial stability in these countries and hence worsen the economic situation.

Insert Figures 1 through 4 about here

Figures 1 and 2 present evidence of the country's average estimated loss of GDP and the sum of GDP loss as of 2016 respectively for the pooled OLS methodology. Figures 3 and 4 present evidence of the same measures of GDP for fixed effects estimation. The darkest shades represent those nations that have lost the most in terms of GDP, with clear signs of the stresses placed on countries in the Middle East, Asia and Africa. China, India, Iran, Iraq, Pakistan, Russia, Saudi Arabia, Tanzania, Thailand, Turkey and the United Arab Emirates are found to be the countries who have lost the most GDP throughout the sample period between 1990 and 2016.

5. Concluding remarks

It is clear that economies of countries located in crisis zones, even if they are not experiencing military actions within their territory, are substantially adversely affected by increasing military spending. Capital investment is crowded out by military spending. It should be noted that the overall GDP losses generated by conflict of 1.18% to place that in context, the sum of the countries' yearly average losses, which are $11.996 trillion,

approximately equate to two-thirds of 2016 US GDP. The total losses of $298.127 trillion is equal almost to four times the size of global 2016 GDP at current US dollars according to the World Bank. The aim of this study was to build upon the work of Abu-Ghunmi and Larkin [2016] and calculate the global losses generated by military conflict. While there are discussions about the idea of military Keynesian, a concept first outlined by Michael Kalecki in his "Political Aspects of Full Employment" in the Political Quarterly in 1943 as an explanation of why Germany's economy recovered during the Nazi period (Kalecki [1943]). Our work illustrates that from a global and national point of view military Keynesian is a myth. Further work is required to look at the impact of cultural and political economy structure to look for differences in responses to conflict zones and the overall effect on FDI flows and capital investment.

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Table 1: Selected international periods of crisis generated by conflict

Start	Finish	Region	Core Country	Start	Finish	Region	Core Country
1990	1991	Gulf War	Iraq	2009	Ongoing	War in Somalia	Somalia
1991	2002	Algerian Civil War	Algeria	2009	Ongoing	Sudanese nomadic conflicts	Sudan
1991	1995	Croatian War of Independence	Croatia	2009	Ongoing	South Yemen insurgency	Yemen
1991	1993	Georgian Civil War	Georgia	2010	Ongoing	Arab Spring	Bahrain
1991	1991	Uprisings in Iraq	Iraq	2010	Ongoing	Arab Spring	Egypt
1991	2002	Sierra Leone Civil War	Sierra Leone	2010	Ongoing	Arab Spring	Jordan
1992	1996	Civil war in Afghanistan	Afghanistan	2010	Ongoing	Arab Spring	Kuwait
1992	1995	Bosnian War	Bosnia	2010	Ongoing	Arab Spring	Lebanon
1992	1994	Croat Bosniak War	Croatia	2010	Ongoing	Arab Spring	Libya
1993	2005	Burundian Civil War	Burundi	2010	Ongoing	Arab Spring	Morocco
1993	1993	1993 Russian constitutional crisis	Russia	2010	Ongoing	Arab Spring	Oman
1994	1997	Iraqi Kurdish Civil War	Iraq	2010	Ongoing	Arab Spring	Saudi Arabia
1994	1994	1994 civil war in Yemen	Yemen	2010	Ongoing	Arab Spring	Sudan
1996	2001	Civil war in Afghanistan	Afghanistan	2010	Ongoing	Arab Spring	Syria
1996	1997	First Congo War	Congo	2010	Ongoing	Arab Spring	Tunisia
1996	2006	Nepalese Civil War	Nepal	2010	Ongoing	Arab Spring	Yemen
1997	1997	Albanian Rebellion of	Albania	2011	2014	Iraqi insurgency	Iraq
1997	1997	Cambodia	Cambodia	2011	2011	Libyan Civil War	Libya
1997	1999	Republic of the Congo Civil War	Congo	2011	2014	Factional violence in Libya	Libya
1998	2003	Second Congo War	Congo	2011	Ongoing	Ethnic violence in South Sudan	Sudan
1998	1999	Kosovo War	Kosovo	2011	Ongoing	Syrian Civil War	Syria
1998	Ongoing	Al Qaeda insurgency in Yemen	Yemen	2011	Ongoing	Syrian Civil War spillover in Lebanon	Syria
1999	2003	Second Liberian Civil War	Liberia	2012	2015	Northern Mali conflict	Mali
2003	2011	Iraq War	Iraq	2014	2016	2014 Israel Gaza conflict	Gaza
2004	Ongoing	War in North West Pakistan	Pakistan	2014	2014	2014 Israel Gaza conflict	Israel
2004	2015	Houthi insurgency in Yemen	Yemen	2014	Ongoing	Libyan Civil War	Libya
2006	2007	Sectarian violence in Iraq	Iraq	2014	Ongoing	Russian invasion	Russia
2006	2006	2006 Lebanon War	Lebanon	2014	Ongoing	Russian invasion	Ukraine
2006	2009	War in Somalia	Somalia	2015	Ongoing	ISIL insurgency in Tunisia	Tunisia
2008	2009	Gaza War	Gaza	2015	Ongoing	Kurdish Turkish conflict	Turkey
2008	2008	Russo Georgian war	Georgia	2015	Ongoing	Yemen	Yemen
2008	2008	Russo Georgian war	Russia				

Note: This table reports the selected periods of international crisis that were included in our methodology.

Table 2: Multiple Interrupted Time Series for Foreign Direct Investment as a % of GDP (ln)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Intercept	0.9171	-0.8594	-0.8924	-2.1993	0.5667	-1.5154	-0.9012
	(0.0025)	(0.0179)	(0.0080)	(<.0001)	(0.4064)	(<.0001)	(0.1681)
Trend	0.1293	0.1198	0.0951	-0.2203	-0.1057	0.1720	-0.2912
	(0.0372)	(<.0001)	(<.0001)	(0.0756)	(0.6163)	(0.3554)	(0.2599)
War Level 1	-0.3412	-0.4470	0.4982	1.5606	-1.6087	-0.1247	1.5600
	(0.1874)	(0.0185)	(0.5307)	(0.0002)	(0.0443)	(0.7604)	(<.0001)
War Trend 1		-0.0748	-0.1631	0.2830		-0.0927	
		(0.0005)	(0.5539)	(0.0222)		(0.6232)	
Peace Level 1			-0.0483	0.9368		0.6863	
			(0.8985)	(0.0003)		(0.0187)	
Peace Trend 1	-0.0988			-0.0610	0.2280	-0.0843	0.4068
	(0.1171)			(0.1188)	(0.3144)	(0.1218)	(0.1164)
War Level 2					-0.4968	0.4687	-0.2058
					(0.4599)	(0.1128)	(0.3618)
War Trend 2					0.0538	0.0447	
					(0.4516)	(0.3892)	
Peace Trend 2							-0.1935
							(0.0002)
War Level 3							-0.1583
							(0.6879)
War Trend 3							-0.0154
							(0.9388)

Note: This table reports the results of the multiple interrupted time-series model estimated as a fixed-effect model for FDI as a percentage of GDP (ln). P-values are shown in parentheses. War and peace time dummies are generated based on the methodology described in Section 3.2.1.

Table 3: Multiple Interrupted Time Series for Gross Domestic Product (US$) (ln)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Intercept	23.0354	22.0866	21.9005	23.0467	23.1107	25.6688	24.8203
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Trend	0.1532	0.0859	0.0622	0.0265	0.0511	-0.0280	-0.1000
	(<.0001)	0.1082	(<.0001)	0.2516	0.1038	0.4951	0.1733
War Level 1	-0.3065	-0.0001	0.2787	-0.2495	0.0763	-0.0039	-0.5224
	(0.0082)	(0.9998)	(0.2109)	(0.0022)	(0.4969)	(0.9716)	(<.0001)
War Trend 1		0.0169	-0.0652	0.0193		0.0665	
		(0.9071)	(0.3967)	(0.4025)		(0.1119)	
Peace Level 1			0.0373	0.2852		0.2813	
			(0.8902)	(<.0001)		(0.0003)	
Peace Trend 1	-0.0493		0.0419	-0.0106	0.0245	0.1868	
	(0.0579)		(<.0001)	(0.7469)	(0.0763)	(0.0115)	
War Level 2					-0.3350	0.0797	0.3432
					(0.0010)	(0.2996)	(<.0001)
War Trend 2					0.0717	0.0214	
					(<.0001)	(0.0947)	
Peace Trend 2							-0.0301
							(0.1022)
War Level 3							0.0854
							(0.5582)
War Trend 3							-0.1762
							(0.0068)

Note: This table reports the results of the multiple interrupted time-series model estimated as a fixed-effect model for GDP (ln). P-values are shown in parentheses. War and peace time dummies are generated based on the methodology described in Section 3.2.1.

Table 4: Multiple Interrupted Time Series of Government Capital Expenditure as a % of GDP (ln)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Intercept	2.4624	2.8168	1.3270	2.9794	2.7673	3.0124	3.2802
	(0.5339)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Trend	0.0728	-0.0103	0.0550	-0.0233	0.0642	-0.0417	-0.0519
	(0.9019)	(0.0371)	(0.0025)	(0.8221)	(0.0136)	(0.5848)	(0.5412)
War Level 1	0.0606	-0.0057	0.5112	-0.1011	-0.2591	-0.1325	-0.1916
	(0.8663)	(0.9362)	(0.2314)	(0.7231)	(0.0063)	(0.4610)	(0.1092)
War Trend 1		0.0594	-0.2206	0.0109		0.0419	
		(<.0001)	(0.1742)	(0.9165)		(0.5875)	
Peace Level 1			0.1225	-0.0256		0.0737	
			(0.8245)	(0.8264)		(0.4976)	
Peace Trend 1	-0.0757			0.0375	-0.0529	0.0241	0.0569
	(0.8981)			(0.0557)	(0.0518)	(0.2330)	(0.5033)
War Level 2					-0.2507	0.1637	0.2589
					(0.0023)	(0.1270)	(<.0001)
War Trend 2					0.0256	-0.0451	
					(0.0014)	(0.0140)	
Peace Trend 2							-0.0299
							(0.0251)
War Level 3							0.0464
							(0.6547)
War Trend 3							0.0118
							(0.7986)

Note: This table reports the results of the multiple interrupted time-series model estimated as a fixed-effect model for government capital expenditure as a percentage of GDP (ln). P-values are shown in parentheses. War and peace time dummies are generated based on the methodology described in Section 3.2.1.

Table 5: Multiple Interrupted Time Series of Household Consumption per Capita (ln)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Intercept	5.9968	6.5281	6.3308	6.2075	8.2590	8.4010	6.9063
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Trend	0.0357	0.0326	0.0173	0.0095	0.0105	-0.0186	-0.0299
	(0.0099)	(<.0001)	(<.0001)	(0.4185)	(0.5600)	(0.8048)	(0.5747)
War Level 1	-0.1269	-0.2783	-0.2216	-0.1040	0.1606	-0.0284	-0.3550
	(0.0051)	(<.0001)	(0.0059)	(0.0192)	(0.0500)	(0.6965)	(<.0001)
War Trend 1		0.0316	0.0573	0.0049		0.0410	
		(<.0001)	(0.0368)	(0.6779)		(0.5889)	
Peace Level 1			-0.1181	0.0532		0.0835	
			(0.2153)	(0.1052)		(0.0606)	
Peace Trend 1	0.0068			0.0072	-0.0032	-0.0032	0.0855
	(0.6201)			(0.1345)	(0.8600)	(0.6492)	(0.1109)
War Level 2					-0.1715	0.0736	0.0529
					(0.0378)	(0.0765)	(0.3938)
War Trend 2					0.0139	-0.0117	
					(0.0436)	(0.0633)	
Peace Trend 2							-0.0199
							(0.1697)
War Level 3							0.0454
							(0.6489)
War Trend 3							-0.0359
							(0.4225)

Note: This table reports the results of the multiple interrupted time-series model estimated as a fixed-effect model for household consumption per capita (ln). P-values are shown in parentheses. War and peace time dummies are generated based on the methodology described in Section 3.2.1.

Table 6: Multiple Interrupted Time Series of Military Expenditure as a % of GDP (ln)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Intercept	1.9850	2.0099	0.6682	0.3566	2.6586	1.5299	1.6495
	(<.0001)	(<.0001)	(<.0001)	(0.0246)	(<.0001)	(<.0001)	(<.0001)
Trend	-0.0737	-0.0253	-0.0164	-0.0644	0.0093	-0.0918	-0.1168
	(0.2626)	(<.0001)	(<.0001)	(0.0733)	(0.6900)	(0.0857)	(0.2991)
War Level 1	-0.6107	0.0978	0.0451	0.2432	-0.0459	-0.1109	-0.3933
	(0.0416)	(0.0324)	(0.7062)	(0.0673)	(0.5900)	(0.4271)	(0.0104)
War Trend 1		0.0137	0.0368	0.0063		0.0760	
		(0.0059)	(0.3770)	(0.8603)		(0.1639)	
Peace Level 1			-0.0439	0.0156		-0.0634	
			(0.7640)	(0.8522)		(0.4737)	
Peace Trend 1	0.0555			0.0249	-0.0210	-0.0190	0.1289
	(0.4134)			(0.0435)	(0.4000)	(0.2638)	(0.2526)
War Level 2					-0.1616	0.2082	0.0857
					(0.0300)	(0.0232)	(0.3847)
War Trend 2					0.0142	0.0011	
					(0.0516)	(0.9410)	
Peace Trend 2							-0.0628
							(0.0037)
War Level 3							0.0207
							(0.9010)
War Trend 3							0.0966
							(0.1918)

Note: This table reports the results of the multiple interrupted time-series model estimated as a fixed-effect model for military expenditure as a percentage of GDP (ln). P-values are shown in parentheses. War and peace time dummies are generated based on the methodology described in Section 3.2.1.

Table 7: Multiple Interrupted Time Series of a Number of Variables (sum of dummies)

Variable	LGDPCUS	LMilExpGDP	LGovCapGDP	LFDIGDP
Intercept	22.9444	0.2661	2.7585	-0.9338
	(<.0001)	(0.0501)	(<.0001)	(<.0001)
Trend	0.0358	-0.0487	0.0009	0.0985
	(<.0001)	(<.0001)	(0.9444)	(<.0001)
WarLevel	-0.0769	0.2038	0.0542	0.0480
	(0.0359)	(<.0001)	(0.3829)	(0.7773)
WarTrend	0.0112	0.0044	-0.0148	-0.0536
	(0.0936)	(0.5745)	(0.1868)	(0.0129)
PeaceLevel	0.1718	0.0058	0.0658	1.0251
	(0.0001)	(0.9141)	(0.3573)	(<.0001)
PeaceTrend	0.0356	0.0136	0.0334	0.0106
	(<.0001)	(0.0152)	(<.0001)	(0.4708)

Note: This table reports the results of the multiple interrupted time-series model estimated for a number of economic variables, as fixed-effect models. LGDPCUS; represents GDP (ln); LMilExpGDP; represents military expenditure as a percentage of GDP (ln); LGovCapGDP; represents government capital expenditure as a percentage of GDP (ln). LFDIGDP represents foreign direct investment as a percentage of GDP. P-values are shown in parentheses. War and peace time dummies are generated based on the methodology described in Section 3.2.1.

Table 8: Unrestricted error correction estimation of the international government's capital expenditure model

Dependent Variable: DGovCapGDP					
	Pooled OLS			Fixed One Way Estimates	
Variable	Estimate	P-Value	RSE P -Value	Estimate	P -Value
Intercept	2.82	(<.0001)	(<.0001)	7.73	(<.0001)
MilExpGDP	-0.40	(<.0001)	(<.0001)	-0.47	(<.0001)
DMilExpGDP	-0.28	(<.0001)	(0.11)	-0.14	(<.0001)
FDIGDP	0.00	(0.83)	(0.89)	-0.02	(0.47)
DFDIGDP	-0.04	(0.10)	(0.19)	-0.03	(0.25)
GovCapGDP	-0.10	(<.0001)	(<.0001)	-0.29	(<.0001)
MergedBorDum	0.14	(0.55)	(0.62)	0.17	(0.52)

Note: This table reports the results of estimating Equation 2, using UECM, for a number of countries. DGovCapGDP is the difference in government capital expenditure as a percentage of GDP at time t; GovCapGDP is government capital expenditure as a percentage of GDP at time t-1; MiExpGDP is military expenditure as a percentage of GDP at time t-1; and DMilExpGDP is the difference in military expenditure at time t; FDIGDP; is foreign direct investment as a percentage of GDP at time t-1; DFDIGDP is the difference in foreign direct investment as a percentage of GDP at time t; MergedBorDum is a dummy variable that takes the value of one for each year that experienced war in a neighbouring country and zero otherwise. Source of data used in the estimation is World Development Indicators in the World Bank database. RSE represents robust standard errors. P-values are shown in parentheses. The augmented Dickey-Fuller (ADF) test is used to test for stationarity.

Table 9: Pooled OLS (outliers excluded, US$)

Country	Average ICOR	Ave Drop GovCapGDP	Ave Drop GDP growth	Ave Est Loss GDP	Sum GDP loss (2016)
Afghanistan	-1.45	-0.66	1.51	13,784,759,563	175,787,030,239
Albania	0.28	-0.75	0.22	1,380,098,576	34,053,100,390
Angola	1.20	-2.27	2.43	26,801,876,744	771,352,256,602
Azerbaijan	1.49	-1.30	0.90	8,148,592,311	263,911,737,383
Belarus	0.68	-0.62	0.22	5,010,464,548	102,741,652,681
Bosnia and Herzegovina	2.78	-0.56	0.23	2,013,669,914	35,596,682,547
Bulgaria	0.29	-0.89	0.58	13,676,375,263	322,660,796,644
Burkina Faso	0.37	-0.59	2.55	16,710,445,910	246,917,637,957
Cameroon	1.05	-0.55	0.54	7,622,970,710	162,197,875,371
Central African Republic	-0.15	-0.58	0.51	460,902,208	4,886,315,144
Chad	0.69	-1.07	0.91	3,876,801,423	97,499,092,213
China	2.12	-0.78	4.00	5,999,569,163,707	134,019,235,211,756
Congo, Rep.	2.20	-1.03	0.59	4,651,131,627	44,514,671,339
Croatia	1.93	-1.15	0.18	4,860,239,901	139,430,002,851
Djibouti	1.94	-2.26	1.19	710,777,615	16,831,002,005
Egypt, Arab Rep.	2.28	-1.07	0.33	56,577,284,147	941,465,472,052
Estonia	-2.43	-0.67	0.35	3,611,211,616	94,407,981,589
Finland	2.17	-0.56	0.05	6,818,095,583	213,107,855,527
Gabon	-0.74	-0.60	0.67	4,206,743,164	65,339,933,072
Georgia	1.31	-1.20	2.22	16,639,538,645	396,964,306,018
Greece	-8.57	-1.16	0.15	18,791,688,485	745,939,983,608
Guinea	-3.19	-0.91	0.16	590,779,977	9,934,149,014
Hungary	7.83	-0.54	0.13	8,787,542,655	240,297,073,944
India	1.64	-1.10	0.56	494,120,143,465	14,471,555,214,082
Iran, Islamic Rep.	0.95	-1.01	0.99	114,840,754,543	3,658,257,120,187
Iraq	0.36	-1.10	0.33	2,935,831,821	101,413,445,084
Israel	-1.00	-3.27	0.86	159,880,935,006	3,112,751,911,734
Jordan	1.95	-2.32	1.61	22,056,098,319	689,563,105,017
Kazakhstan	0.15	-0.41	0.57	27,865,446,420	536,728,234,980
Kenya	1.66	-0.63	0.70	16,210,066,434	493,270,398,327
Kosovo	-0.53	-0.26	0.05	240,098,485	1,961,941,587
Kuwait	0.31	-4.97	3.17	72,119,296,070	2,407,614,839,035
Lao PDR	-0.02	-0.79	0.25	879,608,509	14,497,725,679
Latvia	-1.40	-0.46	0.37	5,145,835,602	121,607,555,616
Lebanon	3.03	-1.99	1.66	18,958,752,866	621,820,918,298
Liberia	2.39	-1.62	0.53	393,449,035	5,475,767,256
Libya	0.17	-0.93	0.59	18,370,474,005	258,129,102,878
Lithuania	-1.00	-0.41	0.30	5,034,789,115	134,911,997,020
Mali	0.45	-0.58	-1.33	-23,346,397,480	-419,883,897,235
Mauritania	0.47	-1.13	2.93	4,179,712,491	44,161,309,619
Moldova	0.80	-0.19	0.08	234,019,458	5,600,559,350
Mongolia	-0.45	-0.60	0.22	469,421,175	10,953,652,915
Montenegro	1.40	-0.70	0.28	718,683,276	8,666,778,060
Morocco	3.48	-1.35	0.82	38,849,052,324	1,328,314,722,182
Niger	-2.48	-0.45	1.00	2,738,912,624	54,752,237,709
Norway	1.69	-0.75	0.16	32,029,304,223	1,122,540,893,529
Oman	1.53	-5.01	2.17	56,762,984,105	1,839,873,661,385
Pakistan	-0.19	-1.85	1.48	171,535,108,578	4,681,740,918,061
Poland	-1.15	-0.77	0.21	46,106,966,314	1,317,281,285,183

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Table 9: Pooled OLS (outliers excluded, US$)

Country	Average ICOR	Ave Drop GovCapGDP	Ave Drop GDP growth	Ave Est Loss GDP	Sum GDP loss (2016)
Qatar	-0.2	-1.33	1.43	65,840,830,600	711,084,296,892
Romania	2.47	-0.89	0.33	23,798,651,271	744,178,783,868
Russian Federation	0.39	-1.56	0.91	403,877,312,015	10,403,606,527,022
Rwanda	1.98	-1.1	0.76	1,366,265,675	32,657,977,760
Saudi Arabia	0.88	-3.95	5.83	1,028,444,872,471	37,443,805,829,566
Senegal	0.77	-0.63	0.26	1,796,396,989	45,916,511,205
Serbia	0.67	-1.15	0.56	2,865,109,727	50,262,910,180
Sierra Leone	-0.05	-0.71	1.54	1,682,914,233	33,861,366,306
Slovak Republic	1.46	-0.66	0.27	11,147,555,706	315,341,102,485
Slovenia	3.10	-0.53	0.11	2,966,015,433	79,793,616,890
Spain	3.83	-0.62	0.11	80,098,045,401	2,796,355,429,109
Sudan	0.08	-1.33	3.66	58,891,842,248	1,520,793,882,100
Syrian Arab Republic	3.58	-2.5	1.09	22,116,168,583	483,862,561,806
Tajikistan	0.04	-0.62	0.88	1,191,638,261	18,413,123,650
Tanzania	0.43	-0.49	6.23	107,444,984,749	3,123,035,545,310
Thailand	-0.94	-0.67	0.58	129,741,888,115	3,387,387,585,504
Tunisia	0.87	-0.66	0.33	7,137,551,177	256,044,949,948
Turkey	-5.44	-1.2	0.43	176,064,772,669	3,614,234,395,953
Turkmenistan	1.18	-1.12	0.15	311,888,540	1,428,161,577
Uganda	-1.19	-0.91	1.07	11,959,191,746	280,141,694,112
Ukraine	0.35	-1.17	0.04	-4,346,934,044	-82,092,681,220
United Arab Emirates	1.62	-1.94	1.54	264,850,099,425	5,395,224,446,560
Uzbekistan	3.65	-0.41	-0.09	-1,498,519,687	-13,688,065,792
Vietnam	2.70	-1.02	0.49	47,032,591,468	684,768,519,248
Yemen, Rep.	1.16	-2.24	0.77	13,597,777,481	374,906,754,753
All	0.7	-1.16	0.95	134,770,397,450	247,469,958,442,279

Note: This Table reports the effect of Military Expenditure on economic growth excluding outliers. Average ICOR is the country's average of ICOR, yearly ICOR for each country is calculated by dividing the investment as a percentage of GDP by the GDP growth rate; Ave Drop GovCapGDP is the drop in the country's average government capital expenditure as a percentage of GDP; Ave Drop GDP growth is the drop in country's average GDP growth rate; Ave Est Loss GDP is the country's average estimated loss in GDP; Sum GDP loss (2016) is the country's sum of future value (2016) of the lost GDP and is calculated assuming 2% rate of return (OECD [2013]).

Table 10: Fixed Effect Estimation (outliers excluded, US$)

Country	Average ICOR	Ave Drop GovCapGDP	Ave Drop GDP growth	Ave Est Loss GDP	Sum GDP loss (2016)
Afghanistan	-1.45	-0.8	1.81	16,668,042,438	212,343,277,346
Albania	0.28	-0.92	0.25	1,533,141,801	37,941,551,952
Angola	1.20	-2.77	3.56	32,914,455,903	973,386,195,021
Azerbaijan	1.49	-1.52	1.01	8,245,703,111	276,726,410,161
Belarus	0.68	-0.74	0.26	5,887,789,933	120,683,293,083
Bosnia and Herzegovina	2.78	-0.69	0.30	2,622,705,504	46,327,232,342
Bulgaria	0.29	-1.06	0.70	16,528,409,574	389,723,826,889
Burkina Faso	0.37	-0.71	2.97	19,568,829,427	288,666,408,262
Cameroon	1.05	-0.64	0.63	9,098,004,588	192,632,316,757
Central African Republic	-0.15	-0.66	0.54	464,750,044	4,690,588,350
Chad	0.69	-1.25	1.10	4,648,090,779	116,412,214,017
China	2.12	-0.92	4.67	7,052,731,869,673	157,378,268,723,296
Congo, Rep.	2.2	-1.17	0.74	5,757,945,607	55,349,820,905
Croatia	1.93	-1.42	0.22	5,874,801,674	168,820,037,910
Djibouti	1.94	-2.68	1.42	848,744,934	20,062,203,620
Egypt, Arab Rep.	2.28	-1.27	0.41	68,589,190,102	1,142,624,771,768
Estonia	-2.43	-0.78	0.40	4,200,046,417	109,681,919,435
Finland	2.17	-0.66	0.06	8,385,277,244	264,406,539,942
Gabon	-0.74	-0.72	0.84	5,516,181,305	84,618,723,211
Georgia	1.31	-1.41	2.28	17,331,858,769	412,659,893,488
Greece	-8.57	-1.36	0.18	22,550,580,725	893,684,422,302
Guinea	-3.19	-1.07	0.22	764,225,143	13,219,444,400
Hungary	7.83	-0.64	0.15	10,478,404,743	286,407,520,758
India	1.64	-1.29	0.66	585,784,310,261	17,155,469,789,854
Iran, Islamic Rep.	0.95	-1.18	1.16	138,226,766,262	4,371,593,830,273
Iraq	0.36	-1.27	0.42	13,907,572,433	237,360,324,101
Israel	-1.00	-3.9	1.04	191,415,795,481	3,730,711,572,759
Jordan	1.95	-2.75	1.94	26,295,166,506	823,558,165,169
Kazakhstan	0.15	-0.48	0.66	31,142,894,809	606,398,008,097
Kenya	1.66	-0.75	0.83	19,231,248,201	585,665,641,137
Kosovo	-0.53	-0.28	0.05	261,251,219	2,140,086,346
Kuwait	0.31	-6.17	5.71	116,297,100,845	3,961,262,125,310
Lao PDR	-0.02	-1.01	0.31	1,086,952,890	17,935,399,744
Latvia	-1.4	-0.54	0.43	5,913,611,395	139,800,282,800
Lebanon	3.03	-2.35	2.07	22,925,201,117	755,364,420,252
Liberia	2.39	-1.62	0.59	445,185,861	6,178,578,968
Libya	0.17	-1.14	0.87	26,452,909,322	377,195,769,169
Lithuania	-1.00	-0.47	0.34	5,931,573,153	158,234,627,916
Mali	0.45	-0.68	-1.58	-27,715,187,679	-498,450,506,143
Mauritania	0.47	-1.34	3.69	5,469,970,430	57,278,933,323
Moldova	0.8	-0.23	0.09	257,398,270	6,146,383,252
Mongolia	-0.45	-0.73	0.23	449,302,350	8,645,767,761
Montenegro	1.40	-0.84	0.35	898,150,669	10,837,920,683
Morocco	3.48	-1.59	0.98	45,969,546,065	1,577,208,421,725
Niger	-2.48	-0.53	1.20	3,223,327,598	64,669,782,365
Norway	1.69	-0.89	0.20	39,697,491,264	1,382,950,009,714
Oman	1.53	-5.9	2.64	69,592,181,348	2,254,496,854,747
Pakistan	-0.19	-2.21	1.79	205,071,180,211	5,605,220,245,804
Poland	-1.15	-0.91	0.25	55,508,754,274	1,580,825,016,939
Qatar	-0.20	-1.57	1.79	81,069,258,895	876,086,902,287

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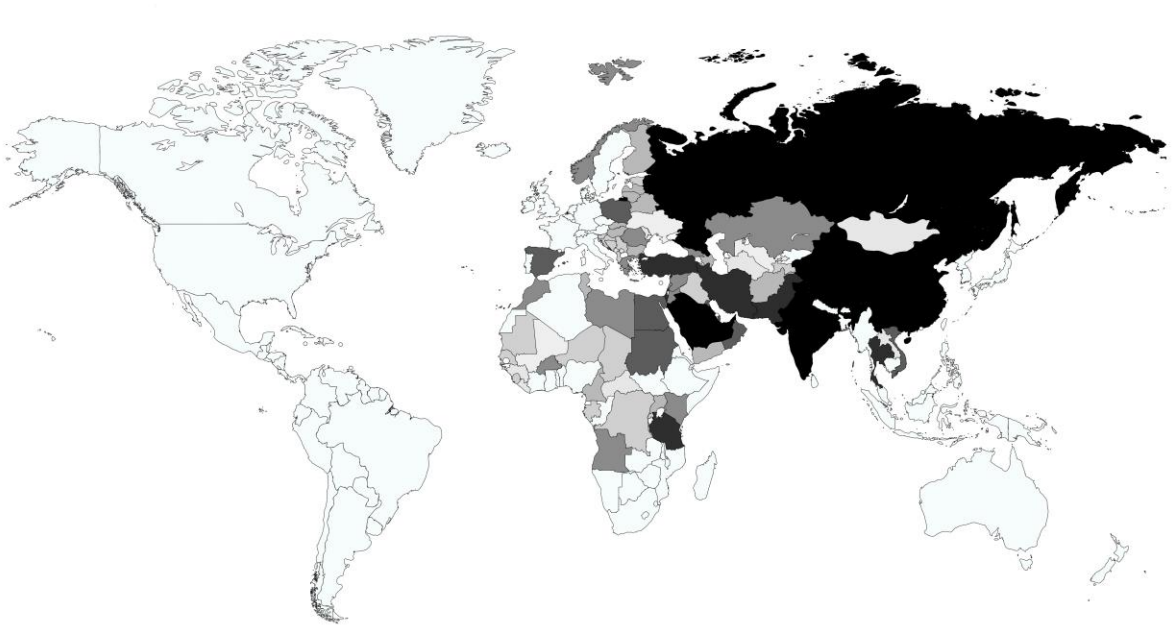
Table 10: Fixed Effect Estimation (outliers excluded, US$)

Country	Average ICOR	Ave Drop GovCapGDP	Ave Drop GDP growth	Ave Est Loss GDP	Sum GDP loss (2016)
Romania	2.47	-1.07	0.41	28,990,683,208	908,690,452,033
Russian Federation	0.39	-1.83	1.10	540,761,977,984	13,546,894,897,091
Rwanda	1.98	-1.31	0.82	1,509,979,613	33,763,368,149
Saudi Arabia	0.88	-4.67	7.27	1,301,678,932,877	47,139,011,962,573
Senegal	0.77	-0.75	0.28	1,951,039,148	48,646,957,383
Serbia	0.67	-1.36	0.81	5,398,176,362	105,599,947,112
Sierra Leone	-0.05	-0.86	1.98	2,142,823,311	43,139,984,985
Slovak Republic	1.46	-0.78	0.31	13,281,584,131	373,656,337,760
Slovenia	3.10	-0.63	0.12	3,489,176,649	93,743,940,483
Spain	3.83	-0.73	0.13	95,958,509,855	3,346,418,059,383
Sudan	0.08	-1.54	4.61	71,334,353,864	1,859,018,134,372
Syrian Arab Republic	3.58	-2.96	1.32	26,964,432,088	589,798,341,721
Tajikistan	0.04	-0.71	1.04	1,396,838,173	21,570,670,737
Tanzania	0.43	-0.58	7.38	128,025,077,767	3,719,438,054,073
Thailand	-0.94	-0.8	0.69	153,680,485,528	4,013,241,069,714
Tunisia	0.87	-0.78	0.40	8,618,341,512	308,069,401,880
Turkey	-5.44	-1.42	0.53	218,263,684,794	4,480,095,510,460
Turkmenistan	1.18	-1.27	0.18	369,476,264	1,687,077,824
Uganda	-1.19	-1.08	1.36	15,615,639,710	364,478,671,790
Ukraine	0.35	-1.34	0.06	-2,181,840,186	-34,292,169,742
United Arab Emirates	1.62	-2.27	1.87	322,428,621,411	6,568,370,739,052
Uzbekistan	3.65	-0.52	-0.13	-2,141,809,572	-19,689,400,717
Vietnam	2.70	-1.25	0.58	55,170,656,627	803,447,861,847
Yemen, Rep.	1.16	-2.66	0.98	16,886,090,981	467,559,042,408
All	0.7	-1.37	1.18	162,102,849,932	298,126,480,601,936

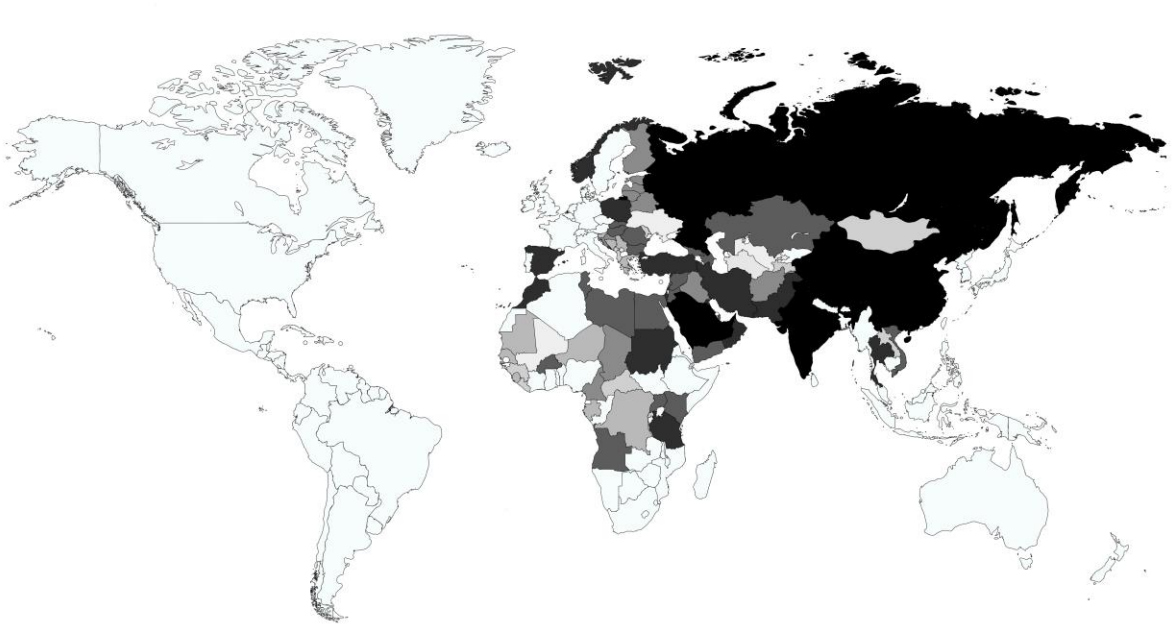
Note: This Table reports the effect of Military Expenditure on economic growth excluding outliers. Average ICOR is the country's average of ICOR, yearly ICOR for each country is calculated by dividing the investment as a percentage of GDP by the GDP growth rate; Ave Drop GovCapGDP is the drop in the country's average government capital expenditure as a percentage of GDP; Ave Drop GDP growth is the drop in country's average GDP growth rate; Ave Est Loss GDP is the country's average estimated loss in GDP; Sum GDP loss (2016) is the country's sum of future value (2016) of the lost GDP and is calculated assuming 2% rate of return (OECD [2013]).

Figure 1: Pooled OLS: Average estimated loss of GDP



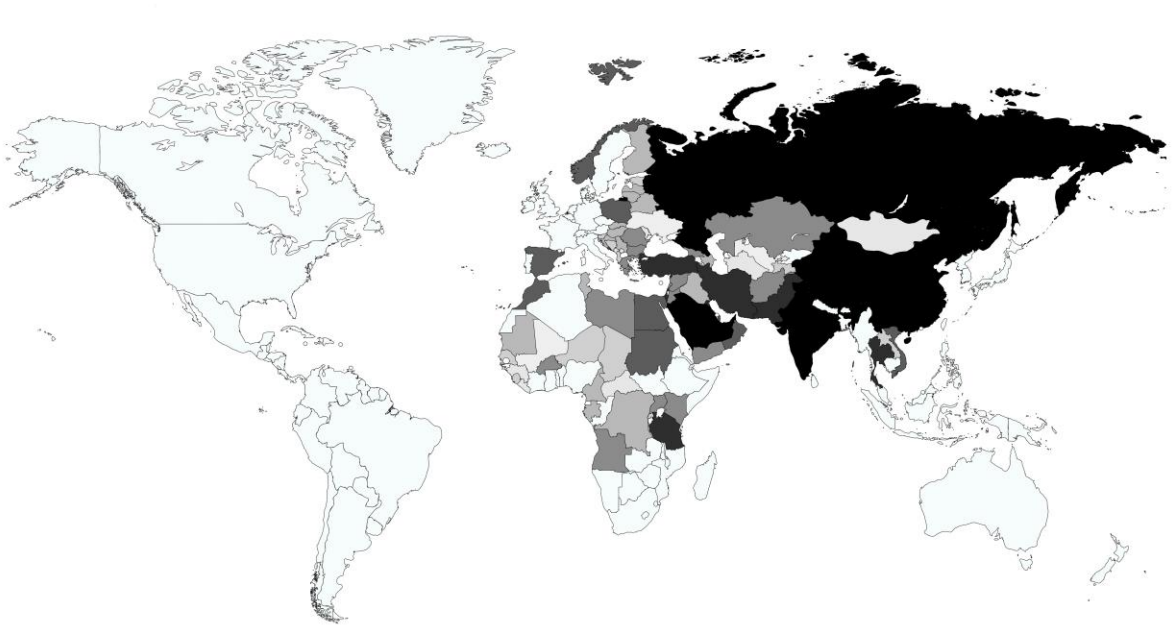
Note: The above figure represents the comparable international average estimated loss in GDP due to military spending using the pooled OLS methodology. The darker shaded regions indicate a higher estimated loss of GDP.

Figure 2: Pooled OLS: Sum of GDP loss as of 2016



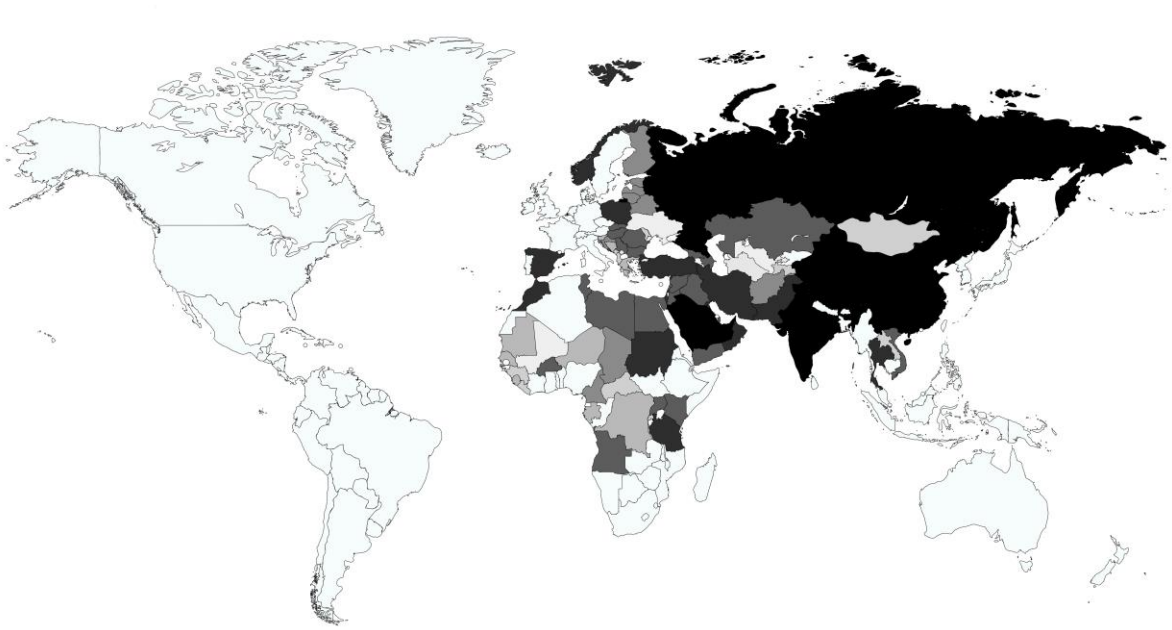
Note: The above figure represents the comparable international estimated sum of lost GDP as of 2016 due to military spending calculated assuming 2% rate of return (OECD [2013]) and using the pooled OLS methodology. The darker shaded regions indicate a higher estimated loss of GDP.

Figure 3: Fixed Effects Estimation: Average estimated loss of GDP



Note: The above figure represents the comparable international average estimated loss in GDP due to military spending using the fixed effect estimation. The darker shaded regions indicate a higher estimated loss of GDP.

Figure 4: Fixed Effects Estimation: Sum of GDP loss as of 2016



Note: The above figure represents the comparable international estimated sum of lost GDP as of 2016 due to military spending calculated assuming 2% rate of return (OECD [2013]) and using the fixed effect estimation. The darker shaded regions indicate a higher estimated loss of GDP.